Information and Environmental Policy:

A Tale of Two Agencies

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Abstract

In recent years, scholars and practitioners have focused increasing attention on the role of information in achieving environmental policy goals. This paper develops a framework for understanding how information is used in making environmental policy, and compares the kinds of information development and communication efforts undertaken by the U.S. Environmental Protection Agency (EPA) and the European Environment Agency (EEA). The analysis suggests that institutional factors such as organizational structure and the mix of policy instruments used by the agency affect the kinds of information efforts undertaken. It also suggests possible areas of focus for environmental information efforts within the EPA and the EEA. These suggestions and the framework provided may also be of use to other environmental agencies.

Disclaimer

The views expressed in this paper are those of the author. They are not intended to reflect the views of his current or former employers.

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Introduction

With the onset of the "information revolution," scholars and practitioners alike are placing increased emphasis on the importance of information in environmental policy. Scholars note that information increasingly constitutes policy in the regulatory arena (Majone, 1997), while practitioners in Europe and the United States are implementing an expanding array of efforts that focus on the uses of information in environmental policy. In spite of this increased attention, the state of our knowledge about the uses of information in environmental policymaking remains in its infancy. We have relatively few analytical tools to describe how information is used in environmental policymaking, the conditions under which it is used in different ways, and the likely consequences of its use.

This paper attempts to improve our understanding of how information can be used to achieve environmental goals. It offers a framework for analyzing public sector environmental information efforts and compares ways in which information is used in the United State's Environmental Protection Agency (EPA) and the European Union's European Environment Agency (EEA). The analysis suggests that variations in organizational structures and policy instruments used affect the allocation of resources and attention directed toward differing types of environmental information activities within the two agencies.

EPA and EEA: Differing Policy Contexts and Common Challenges

By any estimation, the European Union and the United States are very different political entities (Sbragia, Euro-Politics, 1992). They differ in their relationship to their component units and to other countries, as well as in the cultural and linguistic diversity of their populations. Largely as a result of

these socio-political differences, the institutional arrangements for environmental management differ significantly between the US and the EU.

In the United States, the EPA is a multi-purpose agency with jurisdiction over most pollution control issues [1]. State governments in the U.S. possess pollution control authorities not reserved to the EPA. They also share authority over many issues that are subject to EPA jurisdiction. In many instances, state governments are delegated authority to manage federal pollution control programs within their jurisdictions.

In the European Union, jurisdiction over environmental issues at the supra-national level is split between Directorate General (DG) XI of the European Commission and the EEA. DG XI has authority over regulatory policies and most other EU pollution control programs, while the EEA has a mandate to develop and provide information to DG XI, the rest of the European Commission, member states, and the general citizenry. European member nations retain authority over all pollution control issues, subject to basic requirements established by the European Commission and approved by the Council of Ministers.

The EPA and the EEA, as agencies, are also quite different from one another. The EPA is a relatively mature agency, now over 25 years of age. It employs about 18,000 people throughout the U.S., and its annual budget is in the range of $7 to $8 billion. It was created in 1970 through executive order, and drew organizational units and about 5,000 employees from existing federal agencies (The Guardian: EPA's Formative Years, 1970-73, 1993, p. 3). It is an agency with a wide ranging environmental pollution control mandate and a variety of environmental programs and policies. The EPA is led by an Administrator who is appointed by the President and approved by the Senate.

By contrast, the EEA is young, small, and limited in focus. It was created by European Union regulation, and has been in operation for about five years. It employs less than 100 people (Jimenez-Beltran, 1996, p. 34), and these employees are concentrated in Copenhagen, Denmark. The EEA's annual budget is in the range of 14 to 15 European Currency Units (ECU), or $10 to $13 million (Garvey, 1999). Its mandate is focused on environmental information. The Agency is governed by a Board that is composed of representatives from the member states of the European Union (EU) and the European Commission (EC). The EEA Board oversees the activities of an agency Director.

In spite of these significant differences, the EPA and EEA face common challenges in their management of environmental information. The EEA's Director, Domingo Jimenez-Beltran and EPA official Alvin Pesachowitz articulated a common challenge faced by the two agencies in a press release:

> "The U.S. Environmental Protection Agency and the European Environment Agency (EEA) are two distinct organizations with similar information concerns: how to manage the plethora of environmental information within their agencies for the benefit of users, decision-makers, institutions, administrations, and businesses, and how to disseminate that information to the public (Jimenez-Beltran & Pesachowitz, "Environmental Information Strategies at Work," EEA Worldwide Web site, 1998)."

While the focus of this quotation is on internal management of information, the common challenge is larger than the quotation may imply. If information constitutes policy as Professor Majone suggests, what are the information policy options available to decision-makers in public sector environmental agencies? What are their likely consequences? The shared challenge facing EPA and EEA is not only how to manage information for the benefit of users, but also how to use environmental information to bring about public health and environmental improvements. To address this challenge, a framework is needed for classifying and evaluating environmental information efforts.

A Framework for Environmental Information Policies

In generic terms, information is "knowledge obtained through search, study (Webster's Dictionary, 1991)" or other means [2]. Information efforts can take many different forms in environmental agencies, and these forms tend to have different policy consequences. Agencies engage in efforts to develop environmental information, and they engage in efforts to communicate it. This distinction provides the foundation of a framework for analyzing ways that environmental agencies use information.

The framework presented here is one of intent. The categories of information efforts described represent intentions around which agencies organize their resources and attention. Agency leaders have four broad options relating to environmental information -- two relate to information development and two relate to communication. They are summarized below.

Table 1
Types of Environmental Information Efforts

Development	Communication
1. Program Support	3. Motivational
2. Benchmarking	4. Dissemination

These options and their inter-relationships constitute a framework that can be used as a tool for conscious design of policies relating to environmental information. If we are to think about environmental information policy options -- and, in this age of informational advances, it is probably prudent to do so -- it is useful to look at each of these options in greater detail.

Development of Environmental Information

Environmental agencies generally seek to develop environmental information for two purposes. First, they create information that will direct or

justify [3] particular program activities, such as the establishment of specific regulatory requirements. These types of information development activities may be called "program support" information efforts, or "regulatory support" efforts if they focus on providing information to support the use of regulations. A second type of effort seeks to assess the status or trends associated with environmental conditions and/or activities. These kinds of efforts can be called "benchmarking" efforts, because they seek to define benchmarks which can be used to inform debate, aid in setting priorities for future actions, or to help evaluate progress in achieving previously specified goals. Table 2 below and the discussion that follows provide an overview of these two categories of information development efforts.

Table 2

Environmental Information Development Efforts: Types, Examples, and Audiences

Types	Examples	Audiences
Program (Regulatory) Support	*Technical and Policy Analyses	Targeted Audiences: *Public Decision-makers
	*Implementation Guidance	*Program Implementors
	*Site Information - Permitting - Enforcement	*Program Implementors Non-compliant parties Judicial decisionmakers
	*Compliance Assistance documents & training	*Program Audience(s)
Benchmarking	*Environmental and Health Status and Trends Information	Broad Audiences *Public Decision-makers and General Public
	*Environmental Activity Status and Trends Information	*Public Decision-makers and General Public

Program ("Regulatory") Support Information:

"Program support" information comes in many forms, four of which are included as examples in the table above. The discussion here focuses primarily on "regulatory support" efforts because they probably remain the most prevalent of form of effort undertaken by environmental agencies. However, the four forms of regulatory support information efforts outlined in Table 2 could also be applied to non-regulatory programs [4].

Policy and technical analyses to support specific program decisions are an important type of program support informational effort. For example, risk and exposure estimates used in setting maximum contaminant levels for drinking water standards are technical analyses designed for program support, while a cost analysis relating to compliance with drinking water standards is a form of policy analysis used for program support. Program implementation-related efforts include the development of the specific steps necessary for a permit writer to set a discharge limit in a wastewater permit. Site-specific information on particular facilities or geographic locations might be developed to assist in setting environmental requirements ("permitting") or to monitor compliance with existing requirements ("enforcement" related). And the creation of "need to know" criteria for a training course to assist a wastewater operator in complying with the wastewater regulations would be an example of compliance assistance information development.

Regardless of the specific form it takes, program support information is almost always directed toward specific and definable target audiences. It is developed to instigate specific behaviors that are defined in advance. In the case of regulatory programs, program support information development efforts are often targeted toward public sector audiences who have

responsibilities relating to the program. However, private sector audiences may be included in the target audience for program support information, particularly for compliance assistance efforts or for efforts to develop information to support communications programs that seek to bring about changes in private sector behavior.

Benchmarking:

Benchmarking information seeks to assess the status or trends of either the environment itself or environmentally oriented activities. For example, the collection of ambient water quality data to assess "how clean" the water is would be a classic example of benchmarking information. Benchmarking information might also assess environmentally related activities, such as the number of indoor air quality tests conducted, the overall costs of pollution control efforts, or the number of permits issued by a regulatory authority [5].

The audiences for benchmarking information are often quite broad. While benchmarking studies are frequently transmitted to high-level agency officials or legislators, they may also be provided to the general public and stakeholders who have interests in the area being studied. The identities, occupations, and specific reactions of the people who receive and react to the information provided are often less clear than is the case with program support information.

Partially as a result of these ambiguities relating to audience, the specific policy consequences of benchmarking information are generally not known in advance. And even in the case of definable agency heads who may receive a benchmarking study, it is likely that his/her reactions will be shared and combined with the reactions of others before follow-up actions are taken and the consequences of the benchmarking effort becomes known.

Benchmarking efforts often inform debate debate, but they generally do not – in and of themselves -- determine specific program solutions.

Communicating Environmental Information

Efforts to communicate environmental information also fall into at least two broad categories. The first category relates to the messages and content of the information to be communicated. Information efforts in this category may be called "motivational" because they seek to motivate particular decisions or behaviors on the part of the targeted audience(s). The second type of communication effort relates to processes rather than content. Its focus is to ensure that information, once developed, is available to its target audiences. These kinds of information activities may be called information dissemination efforts. Table 3 below provides an overview of these two categories of communication efforts, examples of different forms they may take, and a description of some of the audiences toward whom they may be directed.

Motivational Information:

When communicating information, environmental agencies often have particular goals they are trying to achieve. In these cases, they craft communications to focus on messages that motivate target audiences to make particular decisions or take particular actions. Content material is then chosen and/or organized around these messages [6]. Thus, motivational information efforts focus on crafting messages and information presentation in ways that bring about specific behavioral changes.

Table 3
Environmental Communication Efforts: Purposes, Examples and Audiences

Type	Examples	Audiences
Motivational	*Program support communications - guidance papers, etc.	Targeted Audiences *Public decisionmakers, implementors, program audiences
	*Social Marketing - brochures - advertising	* Publics & consumers * Publics & consumers
	*PR Incentive Programs -Labeling and Awards	*Private companies & consumers
	-Disclosure Requirements	*Private companies, the public, & emergency response officials
Dissemination	*Information Hotlines & Clearinghouses * World-Wide-Web sites * Newsletters * Education & Training	* All Audiences

Like other types of information efforts, motivational efforts come in different forms. For example, regulatory support information development efforts often result in motivational communications. Briefings for high level officials, guidance documents for program implementors and compliance assistance documents and training curricula often contain clear messages and content that supports their messages.

Other examples of motivational communications include social marketing efforts [7], public relations incentive programs, and information disclosure requirements. Social marketing efforts may involve brochures or

advertising that contain clear recommendations for action or decision by the general public or more specific audiences. Public relations incentives motivate consumers to purchase particular products and motivate companies to produce products in an environmentally friendly manner. Environmental labeling efforts such as the EU's "ecolabel" program may be the best examples of this kind of communication effort. Disclosure requirements relating to toxic substances might also be considered motivational insofar as they motivate companies to reduce their reliance on the toxic substances about which they are required to report. In this case, transparency of information, in and of itself, may motivate the desired behavioral changes.

Motivational information may be targeted toward a variety of audiences. Motivational communications growing out of program support information development efforts can be focused on public or private audiences who have program-related roles or responsibilities. For example, a document for permit writers which includes the steps necessary to write a good wastewater permit is an example of a program support motivational effort targeted toward a regulatory official [8]. Social marketing campaigns and public relations incentive efforts can also be targeted toward different groups. For example, brochures or information packets may be disseminated to a variety of groups to motivate them to engage in environmentally friendly behaviors. Those who live in communities with recycling programs may be motivated to separate their garbage, while homeowners may be motivated to conserve energy or to test their homes for indoor air pollutants. Likewise, private sector companies may be the targets of labeling, awards, or disclosure requirement programs -- all of which seek to instigate environmentally friendly behaviors.

Information Dissemination:

Dissemination efforts are different in character than the three previously mentioned categories of environmental information effort. They are different in that they represent a constellation of actions designed to enable audiences to take advantage of motivational, program support, and/or benchmarking information. As such, dissemination efforts can determine the success or failure of all other forms of information effort.

Information dissemination efforts can take many forms. They include information clearinghouses, hotlines, World-Wide-Web sites, newsletters, and delivery of general information training. In the case of regulatory support or benchmarking efforts, however, dissemination efforts may be quite routine. Often, these efforts have consisted of little more than memos sent to key officials communicating either minor policy changes or information on permits issued or enforcement actions taken. By contrast, dissemination efforts that are tied with active motivational information efforts can become quite involved and can include full-scale public advertising efforts [9].

The policy consequences of dissemination efforts vary, depending on the content of the material to be disseminated. Dissemination efforts allow all other forms of information efforts to have impact, and they take on the audience and policy consequence characteristics of the types of information they are disseminating (program support, benchmarking, motivational, etc.). However, it is not unusual for clearinghouses, hotlines, and World-Wide-Web sites to disseminate many forms of information. In these cases, the impacts of the dissemination effort depend upon who accesses the information, and how they choose to use it. Thus, dissemination efforts may serve all audiences and have impacts that cannot be defined in advance. Nevertheless, it should be noted that a busy clearinghouse or World-Wide-Web site with an active

clientele holds the potential to have significant impacts on behavior, and -- consequently -- on the environment as well.

One thing that should be apparent from this discussion is that the agency information efforts specified here are "ideal types." They are not mutually exclusive categories. For example, dissemination information programs use information generated by motivational, program (regulatory) support, and benchmarking programs to accomplish their ends. Information efforts may also share traits in other ways. It is not unusual, for example, for benchmarking efforts to provide information that is used to set priorities for regulatory efforts. In this case, benchmarking information is used for regulatory support purposes.

In spite of their prototypical nature, analyses based on these information categories can provide insights relating to the likely audiences and consequences of different kinds of informational efforts. Table 4 below and following narrative summarize some of these insights.

Program support and motivational efforts tend to have clearly defined audiences, and -- when designed and implemented well -- they tend to bring about predictable consequences. They are therefore appropriate in cases in which well-defined environmental problems are of particular concern, and specific behavioral changes can correct them.

Table 4
Levels of Certainty -- Audiences and Intended Impacts

	High	**Low**
Information Development	Program (Regulatory) Support Efforts	Benchmarking Efforts
Communication of Information	Motivational Efforts	Dissemination Efforts

By contrast, the audiences and expected impacts associated with benchmarking and dissemination efforts are less certain. Benchmarking efforts are generally of interest to broad audiences and they can help foster communication and shared understandings of environmental problems. Their primary predictable consequence is political in nature. If done professionally and credibly, they may enable progress in cases where it did not seem possible, or they may accelerate progress in cases where it had previously been slow due to miscommunication, mistrust, or disagreements. Benchmarking efforts are therefore appropriate in cases where problems are not well defined and there are differing views regarding priorities and solutions.

Dissemination efforts have a wide range of impacts. As was mentioned previously, when these efforts are simply vehicles for conveying information developed as a result of program support, benchmarking, or motivational efforts, they take on the audience characteristics and likely consequences of those types of efforts. However, when dissemination efforts take the form of clearinghouses, World-Wide-Web sites, or other widely available information access points, they hold the (uncertain) potential for many kinds of effects. These latter kinds of dissemination efforts are particularly appropriate when many people have environmental concerns that they would like to address, but do not have the information they need to act on their concerns.

Organizational Characteristics and Agency Decision-making

The allocation of resources and attention to differing types of environmental information efforts depends on agency-specific decision-making processes. Two important factors affecting these decision-making processes are organizational structure and the mix of policy instruments used by the Agency.

In this paper, "organizational structure" refers to a relatively broad concept. It refers to the goals driving agency actions combined with the organizational forms that are created to achieve these goals. The "goals" are most often contained in mission statements, legislatively established goals and requirements (enactments), or statements and communications of agency leaders. Goals contained in statutory mission statements and legislative enactments are enduring in character, and exert influence on agency behavior that may transcend particular leaders. They serve as written criteria against which the behavior of the agency is measured.

Written mission statements and statutory enactments affect agency decision-making and behavior in at least two important ways. First, mission statements and statutory enactments affect the ways in which agency leaders direct the human and material resources at their disposal. Agency leaders are evaluated in relation to goals included in mission statements and legislative enactments. They therefore tend to communicate their intentions in ways that are consistent with written mission statements and statutory enactments. If they do not, they risk unwanted negative reactions from legislators and higher level executive officials, as well as leaders of influential interests.

And second, written mission statements and statutory enactments are important because they guide decision-making by lower level agency officials who carry out policies without specific guidance from agency leaders. In the absence of direct guidance from agency leaders, mission statements and statutory enactments provide defensible guidance which can be used in interpreting (and justifying) how to address new issues for which there is little or no precedent. Mission statements and statutory enactments are therefore also important in cases in which agency leaders are not heavily

involved in the issue(s) at hand. These may be relatively non-controversial matters, but they can also be important in terms of impact or precedent.

However, when agency leaders become heavily involved in an issue, their statements and guidance often become particularly important in establishing immediate goals for action -- often to a degree that exceeds written mission statements or statutory goals. For in these cases, subordinates have clear guidance to implement and an expectation that their actions are important because they are receiving the attention of those in authority within the agency. However, because agency leaders can focus on only a limited number of individual issues, this source of agency goals becomes important only in selected instances.

The "forms" associated with organizational structure refer to the formal trains of responsibility and accountability in the Agency. They are often discernable by looking at an agency organizational chart. However, they may be supplemented in important ways by ad hoc task forces created by Agency leaders or other "cross-unit" team structures. Organizational forms mold the relations between officials within an agency, and define the roles that people play in carrying out their work. They affect agency decision-making because they determine who decides on agency actions relating to particular issues --- and the substantive content of decisions is heavily influenced by whom in the agency makes them. In combination with agency goals, these organizational "forms" help determine how the work to be done is defined and directed.

Considered together, an Agency's "goals" and "forms" create an organizational structure that influences incentives and controls that affect its decision-making. Budget allocations, performance rewards and punishments, and personnel appointments are all influenced by the goals of agencies and the formal trains of responsibility within them. And because agency officials

respond to incentives and controls (Gormley, 1989 and 1991), the agency's structure helps direct the manner in which decision-making processes allocate resources and attention toward different activities. These processes affect decision-making relating to information efforts just as they do with other kinds of decision-making. They are also likely to affect the allocation of information efforts among the program support, benchmarking, motivational, and dissemination categories discussed cross earlier in this paper.

The "mix of policy instruments" used within an agency refers to the concentration of the agency's activities around particular tools for achieving its goals. These tools, or instruments, can be defined as the "set of instructions and rules that together form the law or administrative direction from government (Bruijn & Hufen, 1998)." In more simple terms, they are the ways in which government seeks to get things done. The policy instruments used by environmental agencies vary, although regulatory, economic, and information based instruments are the three categories of policy instruments that typically receive most attention (Schultze, 1977; Mendeloff, 1988; Alm, 1992). For our purposes, the contrasting effects of regulatory and information based instruments on agency information efforts are most instructive since these are the policy instrument categories that are most prevalently used by the EPA and EEA. However, a focus on information efforts associated with economic or other instruments might be of equal or greater importance in other contexts.

Regardless of the context, information efforts are a necessary component in the successful use of most policy instruments. But different kinds of information efforts are needed to support different kinds of policy instruments. As a result, the mix of policy instruments used within the agency will influence the types of information efforts it undertakes. Consequently,

the types of policy instruments used are also likely to influence the allocation of the agency's resources and attention among program (regulatory) support, benchmarking, motivational, and dissemination efforts.

For example, regulatory programs generally require substantial program support information development efforts to justify the value of the requirement(s) imposed. These efforts are necessary to help ensure that the regulation is appropriate and will withstand external scrutiny. Program support information development efforts can also help ensure that the regulation is implemented effectively by program administrators and the regulated community. Conversely, regulatory policy instruments are often accompanied by rather modest communication efforts. Those communication efforts that are undertaken -- whether they are related to motivation or dissemination, or both -- tend to be targeted toward specific audiences such as senior officials, program administrators, and organizations and individuals who must comply with regulatory requirements.

While information based policy instruments vary in design, they tend to require different kinds of information development efforts than regulatory programs. Information development efforts that support information based policy instruments often focus on ensuring that data obtained is of known quality, and on understanding the needs and characteristics of the audiences toward whom they are directed. This is because consumers of environmental information ask themselves whether the information they receive is credible and reliable, and whether they should change their own behavior because of it.

Information based policy instruments also tend to rely more heavily on information communication efforts than regulatory policy instruments, although the mix of motivational and dissemination efforts is likely to depend

on the type of information based policy instrument being used. Those information based policy instruments that seek to achieve specific and pre-defined changes in behavior, for example, require motivational communication efforts that involve framing information in ways that are well received by their target audiences. Dissemination efforts are of critical importance to all information based policy instruments, regardless of whether they involve specific motivational efforts or simply the dissemination of existing information (clearinghouses, etc.)

While it is not my intent to discern first causes here, it is useful to note that changes in policy instrument mixes and organizational structures often accompany one another. As new policy instruments are authorized or emphasized by new statutes, new organizational structures are often created to implement them. Conversely, changes in organizational structure may give rise to changing policy instrument mixes as new goals and accountability forms lead to changes in the utilization of policy instruments which are authorized by existing laws.

Organizational Characteristics and Decision-making: EPA and EEA

The EPA and the EEA differ in their organizational structures and in the mix of policy instruments they use. Table 5 below presents these differences in schematic form, and accompanying narrative provides further explanation.

Decision-making at EPA

Partially as a result of its birth by executive order, the EPA -- to this day -- has no clear statutory mission. Its goals derive primarily from the statutes it administers. The major organizational forms in the Agency also adhere generally to these statutes. This predominant structure has been

supplemented through the years as successive EPA administrators have asserted differing versions of the Agency's mission [10]. They have also made incremental changes in organizational forms. A number of these changes have occurred since 1985, in combination with a significant increase in the variety of policy instruments used by the Agency.

Table 5
Organizational Characteristics of the EPA and the EEA

Agency	Structure	Mix of Policy Instruments
EPA	**Combined** -- media, functional, and -- occasionally -- "cross-unit" forms. Forms often driven by substantive "program" goals that are often found in environmental statutes.	**Regulation** has been the primary instrument, but a move toward new instruments gained momentum between 1985 and 1990.
EEA	**Functional,** and driven by information based goals contained in the Agency's Founding Regulation.	**Information** Only

Nevertheless, EPA is a mission-oriented agency -- at least at the level of its program offices. Its four major program offices (Air and Radiation, Water, Pollution Prevention and Toxic Substances, and Solid Waste and Emergency Response) divide responsibility for the implementation of particular environmental statutes [11]. The Agency's functional and regional offices play critical roles in statutory implementation, but their roles have often been viewed as ones of support for implementation that is directed by headquarters program offices[12].

The statutes administered by the program offices often contain environmentally oriented goals and requirements. Several sample goal statements from statutes administered by the Agency are shown below:

"To protect and enhance the quality of the Nation's air resources so as to promote the public health and welfare and the productive capacity of its population [CAA, Sect. 101(b)(1)];

"To restore and maintain the chemical, physical, and biological integrity of the Nation's waters [CWA, Sect. 101(a)];

"to promote the protection of health and the environment and to conserve valuable material and resources [RCRA, Sect. 1003].

Employees in the program offices focus on, and are held accountable to program objectives that relate to these and other environmental goals.

In general, the mix of policy instruments used within the EPA has been heavily weighted toward regulation. Most statutes passed during the 1970's included regulatory mandates and resources allocated to the agency were often tied to regulatory outputs. This regulatory emphasis survived into the 1980's re-authorizations of the statutes passed in the 1970's, and is still alive today. Nevertheless, over the last fifteen years, the EPA has increased its reliance on non-regulatory policy instruments, including both information-based policies and economically oriented approaches. The increasing use of different policy instruments within EPA starting in about 1985 has been accompanied by continuing and incremental changes in organizational structure.

A number of factors contributed to these changes. The Reagan administration's attack on EPA's regulatory programs had something to do with it, as did Administrator Ruckelshaus's effort to restore the agency's focus with a new risk based management outlook (Andrews, 1994) -- an outlook that was subsequently adopted by other administrators. However, other factors were also important. These factors included growing recognition of the importance and prevalence of diffuse (agricultural runoff, etc.) environmental problems

(Alm, 1992), significant budget constraints, continuing concerns about the costs and effectiveness of regulatory policy instruments (Schultze, 1977; Mendeloff, 1988; Alm, 1992), and high levels of continuing public concern about the environment ("Environmental Protection in the 1990's ...," 1991).

Taken as a whole, the changes in organizational structure and the mix of policy instruments used within the EPA since the mid-1980's have been significant. New statutes relating to toxic substances, indoor radon, pollution prevention, environmental education, clean water, clean air, and safe drinking water have been enacted. These new statutes, in combination with the agency's focus on environmental "risk reduction and --- more recently --- on "sustainable development," have led to significant changes in Agency goals. Traditional regulatory goals have been modified and supplemented with broader goals relating to risk reduction and sustainable development. In addition, the new statutes have led to the creation of new organizational units and reporting chains in the agency. The recent statutes have also increased the agency's focus on new policy instruments, and particularly information based policy instruments. The result is that there is now a broad range of policy instruments being used within EPA. While the overall concentration of activity within EPA probably remains weighted toward regulatory policy instruments, non-regulatory policy instruments are emphasized to a much greater degree than they were before the mid-1980's.

Decision-making at the EEA

The EEA's organizational structure and mix of policy instruments is quite different than the EPA's. Because it is a newly created Agency that has not endured numerous re-organizations, it's organizational characteristics appear less complex than the EPA's. In addition, the range of policy

instruments available to it is far more limited -- focusing, by EC regulation, on information only.

Unlike the EPA, the EEA has a clear statutory mission -- one based in the EEA's founding regulation. This regulation suggests that the objective of the EEA is to "provide the Community and Member States with:

> o objective, reliable and comparable information at the European level enabling them to take the requisite measures to protect the environment, to assess the results of such measures and to ensure that the public is properly informed about the state of the environment,
>
> o to that end, the necessary technical and scientific support (EEA Annual Report - 1996, Annex 10, p. 44)."

The same regulation specifies that the EEA should aim to set up a European environment and observation network (EEA Annual Report - 1996, Annex 10, pges. 44-45). However, it provides no explicit powers to compel members of the network to provide information [13].

Consistent with its Agency-wide information based mission, the EEA is organized functionally and in units that correspond to information based concerns. Major functional offices within the agency include Monitoring and Databases, Analysis and Integrated Assessment, and Infrastructure Publications and Information. While I have not encountered specific goals or objectives associated with these functional units, one would expect them to focus on information based objectives that support the agency's larger information mission. Thus, EEA's organizational structure appears to encourage a focus on information related goals such as consistent monitoring protocols and data management, useful compilations and analysis of existing information, and effective information dissemination.

Significantly, the sole policy instrument available to the EEA is environmental information, although the Agency's mandate in this area appears broad. The EEA does not possess regulatory authority, and its

resources are not allocated primarily for implementing either regulations or other types of policy instruments. This focus on information based policy instruments suggests that the information efforts within the EEA are likely to focus on supporting this particular kind of policy instrument.

These organizational characteristics (structures and policy instrument mixes) within the EPA and the EEA have consequences for decision-making relating to environmental information. Because of the strength of EPA's "media" based organizational units, one would expect substantial information development efforts that are "program support" oriented in the sense that they focus on supporting efforts to achieve environmental goals set forth in particular statutes. A likely by-product of this orientation toward statutory goals would be a tendency for (media) program office decision-making processes to be segmented from one another and focused on goals that are particular to the individual statutes they administer [14]. One might also expect occasional efforts to bridge this segmentation through environmental benchmarking and dissemination efforts generated by the agency's functional and regional offices, as well as agency leaders. One would also expect communication efforts that are motivational in character, with regulatory support related communications being increasingly supplemented by other forms of motivational communications as reliance on non-regulatory policy instruments expanded starting in the mid 1980's.

By contrast, the EEA's functional structure and focus on information as a policy instrument suggest that it could develop decision-making processes relating to environmental information that are relatively independent of particular environmental statutes or programs. One might therefore expect benchmarking information efforts that focus on development and

communication activities that are tied broadly to the environment, but not as closely to specific environmental program goals. These same influences would also lead one to expect substantial information dissemination activities. While motivationally oriented communication efforts are not specifically required by the Founding regulation, they do appear to be legally permitted. Thus, one might see occasional efforts of this kind directed by agency leaders, but they are not likely to be prevalent because the program structures necessary to drive them on a regular basis do not appear to be in place.

As we shall see below, these expected allocations of information efforts have largely materialized. And these findings support the overall suggestion that organizational structures and policy instrument mixes influence the types of information efforts undertaken in environmental agencies.

Information Efforts at EPA and EEA

It is useful to assess both the quantity and quality of agency information efforts. The quantity of effort reflects, at least indirectly, the resource commitments made by the Agency, while the level of coordination across different agency units is often related to the level of attention the information effort receives at the higher levels within the Agency.

This review of EPA and EEA information efforts is an overview based on published literature. It is based on an aggregate assessment of information efforts within the two agencies over their lifetimes, and does not seek to measure small changes in emphasis in each Agency's information efforts over time. The analysis focuses on the allocation of information efforts across the categories outlined above, rather than absolute measures. It would not be fair or useful to compare the aggregate output of a large and mature agency such as the EPA with the aggregate output of a small and young agency such as the

EEA. In spite of these limitations, however, I believe the analysis presented is essentially accurate in thrust and direction, if not in all the details.

Information Efforts at EPA

The EPA has undertaken information efforts in all four of the categories of information effort presented earlier in this paper. However, the extent of the EPA's efforts and the level of coordination in these areas has varied.

Information Development at EPA:

Because of the agency's "program" driven structure and its reliance on regulatory policy instruments, regulatory support information development efforts have been far more prevalent at EPA than benchmarking efforts. It is worth noting, however, that changes in organizational structure and policy instrument mixes during the mid-to-late 1980's contributed to at least two new and significant benchmarking efforts.

Since the Agency's inception, efforts to generate technical and policy analyses necessary to direct development of regulations have been extensive and continuing. These have been primarily research, data collection, and analytical efforts intended to produce information supporting particular regulatory requirements. They have often been undertaken by that agency program offices that set regulatory standards, although important contributions have also been made by the agency's functional and regional offices, external organizations, and the EPA Science Advisory Board. The primary audiences for these information generation activities have been regulatory decision-makers within the Agency, key Congressional Committees and decision-makers, and/or U.S. court justices in the event the regulation becomes involved in litigation.

These regulatory support information development efforts have extended across the agency's various pollution control programs, and they have varied in content depending on the program area being addressed and the types of regulatory requirements being developed. For example, extensive efforts have been undertaken to establish technology based wastewater effluent guidelines for use in permits issued to dischargers. Intensive information efforts have also generated data and established processes for setting water discharge and air emission limits that are based on ambient water and air quality standards. In addition, significant risk estimation efforts have been made to support waste and toxic substance regulations.

The agency has also focused extensively on efforts designed to develop information to foster successful implementation of its regulatory programs. These efforts have included development of guidance on implementing regulatory requirements and the development of grant guidance documents specifying ways in which federally supplied funding may be expended for regulatory implementation purposes.

A third type of regulatory support information effort has focused on providing information to assist parties (organizations & individuals) who must comply with EPA regulatory requirements. The agency's Office of Research and Development, for example, operates the Center for Environmental Research and Information (CERI) in Cincinnati to produce technical information to support Agency's regulatory efforts. Another example is the National Environmental Training Center for Small Communities which is funded through the Office of Water, and develops training materials that assist local governments in meeting their environmental obligations.

The EPA's efforts to develop benchmarking information have met with both successes and disappointments. In general, they have been successful

when they have been supported by existing structures and policy instrument mixes within the Agency. They have been disappointing in those cases where they were viewed as not being essential to the achievement of structural goals or the successful use of policy instruments within the Agency.

In broad terms, it is fair to say the EPA does a good job of generating information on its own activities (Fiorino, 1995, pges. 215-17). For example, EPA program offices often provide information on how many permits they have issued, inspections they have undertaken, or enforcement actions they have taken (see Hunter and Waterman, 1996, pges. 125-156). This is also true for non-regulatory programs. The agency's Indoor Air Program, for example, can provide information on how many phone calls are handled by its radon information hotline. In programs designed to carry out particular activities to achieve particular goals, "benchmarking" their activities can become routine and EPA does it quite successfully. Because it is necessary to meet the imperatives defined by their organizational goals, resources are applied and patterns are developed which get the job done.

The EPA has not generally done as well in developing benchmarking information relating to ambient environmental conditions. This is because ambient environmental information has often not been viewed as essential for accomplishing the goals set forth in the Agency's statutes or for the successful utilization of its policy instruments. This situation has occasionally led to problems for the Agency, as in the case of the difficulty it had in demonstrating that millions of dollars spent on sewerage construction grants in the 1970's and 1980's had actually led to improvements in water quality. In fact, ambient water quality monitoring provides a good example of the kind of difficulty the agency has encountered in this area.

The EPA itself does not do extensive monitoring of ambient water quality, at least when compared to what many would consider necessary to get the job of assessing water quality done (see Ringquist, 1993, p. 180). Ambient water quality monitoring, while important for assessing the impact of water regulations, is not -- in most cases -- necessary or essential for issuing water discharge permits or for enforcing permit requirements. As a result, the agency simply does not spend a lot of time and money monitoring ambient water quality.

The agency does, however, collect a great deal of ambient water quality data from the states. Some of this data is entered into its ambient water quality database (STORET) and some of it is combined biennially into a large report (Water Quality Assessment, 305(b)) which is then provided to Congress. The data provided in STORET and the 305(b) report, while probably useful for some purposes, does not provide a reliable picture of ambient water quality throughout the United States (See "The Nation's Water....," 1986; Ringquist, 1993, pges. 179-80). While there are many reasons for this deficiency, some of which are technical in nature, perhaps the most important one is that the agency has traditionally not imposed and enforced stringent standards for the data it receives from the states. The structure of the agency and the policy instruments it has relied upon have not required it. It is worth noting that similar criticisms have also been made of the EPA's ambient air monitoring systems (see Crandall & Portney, 1984, pges. 49-52).

It is also worth noting that there were a couple of very significant benchmarking successes undertaken by the EPA in the 1985-90 time period, and these successes were enabled by factors associated with agency structure and policy instrument mixes. In 1987, the Agency's Office of Policy, Planning, and Evaluation (OPPE) issued an important report entitled, Unfinished

Business: A Comparative Assessment of Environmental Problems. The report included a ranking of environmental problems done in cooperative fashion by senior managers within the Agency (Unfinished Business, 1987). It also provided an analytical foundation for the establishment of risk reduction as a guiding principle in the agency's decision-making processes.

In 1990, the OPPE worked with the Agency's Science Advisory Board to issue a follow-up report entitled Reducing Risk: Setting Priorities and Strategies for Environmental Protection. This report generally confirmed the rankings published in the 1987 report and endorsed the Agency's move to expand the policy instruments it uses to reduce environmental risks (Reducing Risk, 1990). While neither of these reports provided complete data on ambient environmental quality, they did constitute a comprehensive assessment conducted by qualified individuals that was designed to assist the agency in setting future priorities.

The Unfinished Business and Reducing Risk benchmarking efforts were successful because Agency leaders placed a level of emphasis on them that was sufficient to alter goal structures within the Agency. These structural changes enabled the Agency to transcend its traditionally segmented decision-making processes. At the same time (1985-1990), the Agency was expanding its use of different policy instruments in areas as diverse as radon, lead, and toxic chemicals. The results were significant benchmarking efforts that enabled politically disparate processes within the agency to move in a new and common direction. And in this case, the new direction was the achievement of environmental risk reductions through a broadening array of new and now widely recognized policy tools [15].

Communicating Information at EPA:

It is probably fair to say that EPA did not focus substantial attention on communicating information in its early years. It developed and disseminated information supporting its regulatory programs, but it probably did little beyond what was necessary for this purpose. Beginning in the mid to late 1980's, the agency's communications efforts expanded substantially with the addition of its agency-wide risk reduction framework, new communications related statutory goals, and new policy instruments. The result has been substantial growth in communications efforts targeted to achieve specific behavioral changes, supplemented by growing array of dissemination networks.

In the first decade of its existence, the agency's motivational information efforts were probably focused on creating briefings and guidance documents to assist in regulatory decision-making and implementation. Often, these motivational materials were disseminated through memoranda or letters to EPA regional offices and state agencies. Compliance assistance documents could be obtained from the Center for Environmental Research and Information (CERI) and other sources within the Agency, but active technical assistance efforts were not a large component of its activities.

The structural changes and policy instrument expansion that occurred in the 1980's brought about a significant increase in the number of motivational and dissemination based communication efforts. The motivational information efforts at EPA have come in three major forms -- social marketing efforts, public relations incentive programs, and expanded compliance assistance efforts.

The social marketing efforts undertaken typically involved persuasive public information, supplemented by technical assistance to build state and/or

private sector capacities to reduce environmental risks. Program efforts of this type were mission oriented in that they aimed to inform people and organizations of specific environmental or health risks, with the expectation that these targeted audiences would then make decisions that led to risk reductions. An early example of a social marketing program approach within EPA was the Radon Action Program. It provided public information on radon risks and a capability development effort to ensure an adequate supply of qualified radon contractors to measure and reduce radon levels in houses and other structures. Similar -- although not identical -- combinations of public information and technical capability development efforts have been used in other agency programs, such as lead abatement and safe drinking water.

Motivational information efforts that rely on public relations incentives have also been used in EPA. These programs allow organizations to use endorsements or statements by the agency on their activities in exchange for operating in an environmentally friendly manner. A well known example of this type of program involved incentive components that were added to the Community Right to Know Provisions of the Superfund Amendments and Reauthorization Act (SARA) of 1986. Under SARA's "community right to know" provisions, companies were required to disclose information on the toxic substances they use to their communities. Administrator Reilly's subsequent establishment of EPA's 33/50 program in 1991 provided public relations incentives for companies to reduce their discharge of priority chemicals into the environment. Companies that committed to 33% and 50% reductions in their use of certain priority pollutants over defined time periods could then advertise their participation in the program.

Compliance assistance motivational efforts have also increased since the agency's structural and policy instrument re-alignments of the mid to late

1980's. Notable among these efforts are an increasing number of technical assistance programs carried out by the agency's program and regional offices. For example, the 1996 amendments to the Safe Drinking Water Act (SDWA) initiated a capacity development strategy for safe drinking water that includes substantial and expanded technical assistance efforts funded by EPA and administered by the states. The agency's enforcement office has also been re-organized to focus more on "compliance" and less on enforcement. It has also established "compliance assistance" centers to help targeted groups comply with EPA regulations.

The EPA has also greatly increased its focus on information dissemination since the mid 1980's. Since that time, it has created numerous telephone hotlines, newsletters, and a rather formidable World-Wide-Web site that enables users to download EPA documents. These efforts can claim successes, particularly relating to the motivational and regulatory support efforts they were developed to support. However, the agency's dissemination efforts are limited by its segmented program structures. The agency's experience with its information hotlines and its World-Wide-Web site provides insight into these effects.

The EPA runs or sponsors a number of hotlines (with toll free phone numbers) devoted to providing information on differing types of environmental issues and problems. A recent Access EPA listed over 30 of these hotlines (Access EPA, 1995/6, Chapter 6). Examples include The Pollution Prevention Hotline operated by the Office of Pollution Prevention and Toxic Substances (OPPTS), the RCRA/Hazardous Waste Hotline run by the Office of Solid Waste and Emergency Response (OSWER), and the Small Flows Clearinghouse sponsored by the Office of Water (OW). All of these hotlines can claim successes in responding to requests and in disseminating information.

However, these successes provide a clue as to the deficiencies in EPA's current information dissemination efforts. There are over 30 hotlines, and the agency -- to my knowledge -- has no clear system for referring people among the hotlines as necessary. Thus, customers seeking information to solve a problem may need to work through a maze of acronyms and program descriptions to find the right source of information to help them solve their problem(s). In many cases, it is reasonable to guess that the customer gives up, and the environmental problem they were concerned about does not receive the attention it may deserve. Because the agency's organization is structured around a number of specific environmental purposes, resources and efforts are also structured around those purposes.

A similar situation is evident in the agency's World-Wide-Web site (www.epa.gov). The EPA's World-Wide-Web site can claim substantial successes because it has enabled a wider distribution of the agency's program documents and information from its program databases. However, obtaining information from the site and understanding it in proper context is not as easy as it might be. This is because the site is essentially organized and maintained around the agency's organizational structure, which may not be readily understandable to the general public. As a result, customers must again search for information without proper context. These problems are compounded by the fact that the databases available on the site have data quality problems, which -- to its credit -- are explicitly recognized by the agency. As much as anything, these flaws stem from making data available for the public that were originally collected for purposes other than public dissemination.

As the discussion above suggests, the EPA has expended significant resources and effort on regulatory support information efforts. These efforts

have led to significant regulatory advances. Motivational communications efforts developed later, and they have also achieved successes. These areas of emphasis are due at least in part to organizational structures that focus on substantive environmental goals, as well as the agency's commitment to regulatory policy instruments and information based policy instruments that seek specific behavioral changes.

While benchmarking and information dissemination efforts within the agency have been undertaken with some successes, these successes have been achieved in cases where changes in the agency's structure and/or policy instrument mix enabled it. In other instances, these same factors have inhibited progress. Benchmarking activities that are seen as an integral to the agency's goals and responsibilities have met with success, while benchmarking activities that have been viewed as ancillary have encountered difficulties. Similarly, information dissemination efforts that are consistent with the agency's segmentation into "media-based" structures have encountered successes. Efforts requiring "cross-program" coordination have been successful only when commitments of agency leaders have altered organizational structures within the agency.

Information Efforts at the EEA

The EEA's information efforts over its first five years of operation have focused on benchmarking and the dissemination of information. My review of available documents found few -- if any -- clear cases of efforts that focused on developing program support information or on motivational communications.

Information Development at EEA:

In its relatively young life, the EEA has already made substantial contributions in providing benchmarking information relating to the European environment. Foremost among these efforts have been the Dobris Assessment, published in 1995 [16] and its follow-up report, Europe's Environment: The Second Assessment published in June of 1998. The EEA also has worked to establish a European Information and Observation Network (EIONET) in cooperation with the member states, and has provided a conceptual framework within which its future monitoring and assessment efforts can take place (DPSIR, explained below). In 1995, the Agency also, at the European Commission's request, conducted and published a review of progress under the EU's 5th Environmental Action Program (EAP).

The Dobris Assessment is a large and rather comprehensive compilation of existing information on the state of Europe's environment. It includes extensive information on the pressures, human activities, and problems that describe the state of Europe's environment (Stenners & Bourdeau, p. 7, 1995). It also identified twelve prominent environmental problems that it suggested should lead to both concern and action (Stenners, p. xxiv, 1995).

Several years later, the Europe's Environment: The Second Assessment report provided follow-up information on the problems identified by the Dobris Assessment. Published in June of 1998, this second assessment suggested that there had been progress in reducing pressures on the environment, but also that "progress on emissions reductions .... has not lead to an overall improvement in the quality of Europe's environment ("No Quick Fixes For European Environment," EEA Press Release, June 2, 1998). In fact, in seven of the twelve areas studied, it found "unfavourable development of the state of the environment (EEA, 1998, Europe's Environment: The Second

Assessment, p. 16, Table 1)." The report also suggested that progress had been greatest "in areas covered by by international legal instruments (Op. Cit., EEA Press Release, June 2, 1998)," and pointed to the importance of transportation, agriculture, and other sector based policy areas and their effects on environmental quality.

In addition to these substantive contributions, the EEA's work on the Dobris Assessment and the Second Assessment has provided a framework that can be used to organize and analyze information relating to the environment. The framework proposes analyses focusing on Driving forces, Pressures, the State of the environment, Impacts on human health and ecosystems, Responses with various policy measures --- and is thus referred to as the DPSIR framework (EEA Annual Report 1996, Annex 8). Clearly, consistent use of this framework provides a potentially significant tool for organizing and evaluating environmental information.

The EEA has also focused significant attention on building its environmental information and observation network (EIONET). The EIONET consists of a number of institutions throughout Europe that serve as conduits for environmental information. They receive funding through the EEA budget (EEA Annual Report - 1995, p. 43) and are also supported by individuals who serve as National Focal Points (NFP's) for information emanating from the individual member states. As of 1996, the EIONET included 8 European Topic Centers (ETCs) which focus on particular environmental topics, 18 national focal points, and 512 "component elements (EEA Annual Report - 1996, p. 2)." While this is a potentially significant resource, the Agency has recognized that there is "much to be done" before the EIONET network reaches its potential (Ibid, p. 14-15)." It is also clear from the Agency's founding regulation that the EEA must depend on the cooperation of the organizations in the network.

This is because it does not possess either the authority to require the submittal of information (EEA Annual Report - 1996, Annex 10) or the funds to support the development of the information it needs.

The EEA's founding regulation states that it should produce information to support member state and EC tasks of "identifying, preparing and evaluating measures and legislation in the field of environment (EEA Annual Report - 1996, Annex 10, p. 44)." However, I found few -- if any -- cases in which the EEA was conducting analyses which provided specific direction to EC program efforts. While the EEA's reports on Environmental Taxes (EEA, 1997) and Life Cycle Assessment (EEA, 1998) clearly inform policy debates relating to environmental tax and eco-labeling and audit programs, respectively, they do not specifically direct or justify particular program elements or requirements. They do not, for example, provide specific support for particular standards, technical information to member states on implementing EC directives, or direct assistance guiding the implementation of motivational communication or economic incentive policy instruments. The prevailing interpretation of this provision of the Founding Regulation thus seems to be that EEA's should provide (benchmarking) information that can be used by DG XI and the Commission in prioritizing and developing their own program activities.

One benchmarking effort that DG XI and the European Commission may have applied to their priority setting processes is the EEA's 1995 State of the Environment Report reviewing the EU's fifth Environmental Action Program. It was the first "State of the Environment Report" issued by EEA, although four similar reports had been produced in previous years by the Commission to review progress on previous environmental action programs. This State of the Environment Report reviews major environmental trends and associated EU policies. The general conclusion of this report was similar to that which was

later contained in the Second Assessment. It suggested that the EU was making progress in reducing pressures on the environment but this progress was not sufficient to improve the general quality of the environment or to make progress toward the sustainability goals included in the 5th EAP.

Communicating Information at EEA:

While I did not encounter any specific instances of EEA information efforts that fall clearly in the area of motivational communications [17], the agency has certainly focused attention on information dissemination. For example, the EEA has made substantial efforts to communicate about its reports to the media (Garvey, 1999). While some of these media communications may have been intended to motivate general support for environmental protection or the EEA's role and mission, they do not appear to have been motivational in the sense that they sought to bring about specific behaviors by particular audiences. The EEA has made additional progress in disseminating environmental information through its World-Wide-Web site (EEA Annual Report - 1996, p. 41) and the establishment of an agency library and information center (Ibid, p. 12). Despite these efforts, Director Jimenez-Beltran has identified the dissemination of information as an area where the agency has encountered obstacles due to the substantial resources and efforts necessary for translating documents into the differing languages of the EU (Jimenez-Beltran, 1996, p. 37 ; EEA Annual Report, 1995, p. 8).

The clearest point growing out of this analysis is that the EPA and the EEA have allocated their environmental information efforts quite differently among the information categories defined earlier in this paper. Table 6 below summarizes the differing emphases of these allocations.

Table 6
Areas of Information Emphasis at EPA and EEA

	EPA	EEA
Information Development	Program (Regulatory) Support	Benchmarking
Communicating Information	Motivational	Dissemination

The EPA has focused on developing information to support its environmental programs -- most of which have been regulatory in nature. In recent years, it has also focused greater attention on using information to motivate various populations to undertake different kinds of health and environmental risk reduction efforts. By contrast, the EEA has focused most of its energies on benchmarking efforts relating to ambient environmental quality in Europe, and these efforts have met with success in a relatively short period of time. It is also clear that the EEA is focusing energies on the development of its dissemination networks, but has encountered difficulties relating to translation requirements. The information efforts undertaken by the two agencies are thus consistent with the expectations outlined earlier in this paper. Taken together, they support the suggestion that organizational structures and the mix of policy instruments used influence the allocation of informational efforts undertaken in environmental agencies.

Conclusion

This paper has sought to make at least three contributions. For the academic study of institutions, it has sought to demonstrate ways in which institutional factors affect information outputs in environmental agencies. Second, the paper contributes an approach for classifying and evaluating uses of information in environmental agencies. And finally, on a practical level,

the paper uses a comparative framework to provide policy insights that might be helpful to practitioners working on environmental information issues in the EPA, the EEA, and other environmental agencies.

On an academic level, this paper presents additional evidence that institutions do in fact matter (Weaver & Rockman, 1993). It suggests that organizational structures and the mix of policy instruments used within an agency affect the allocation of the agency's resources and attention toward differing kinds of information efforts. This is important because it means that simple tools such as organization charts, statutory goals and missions, and statutorily defined policy instruments are potentially useful predictors of policy outputs. While the conclusion that public officials do what they are directed to do by both statutes and their bosses should not be surprising, it is important to keep in mind when concerns are expressed about runaway bureaucracies in the US, or irresponsible "euro-crats" in Brussels.

The second contribution of this paper lies in its presentation of a framework that can be used to assess and evaluate ways in which environmental agencies use information. We are entering an information revolution, and a number of factors are converging to make information an increasingly important policy instrument in the environmental arena. These factors include the increasing importance of environmental problems with diffuse sources (agricultural runoff, stormwater runoff, etc.), frustration with the inflexibility and costs associated with command and control regulation (Mendeloff, 1988; Schultze, 1977; Alm, 1992), and growing technological capabilities in information management. Analytical frameworks are needed to deal with the increasing use of information in environmental policy, and it is my hope that the taxonomy presented here makes some useful first steps in this area.

At the practitioners level, this paper takes steps to foster what could be a valuable learning process for the EPA, the EEA, and others interested in public sector environmental management. Several points are worth emphasizing in this regard. First, specific organizational structures and policy instrument mixes have particular sets of advantages and disadvantages relating to environmental information. For example, the organizational characteristics within EPA have enabled it to use information effectively for program support and motivational purposes. These successes provide a firm foundation for future efforts to expand the Agency's use of information in order to bring about further environmental improvements. Because its current programs provide a baseline level of environmental protection, the EPA should be -- and is -- focusing more attention on ways to use information effectively. The agency's major challenge, however, is institutional -- it must maintain the benefits of its existing structures without allowing them to inhibit more effective use of information to achieve its goals.

By contrast, the EEA's major advantage in addressing its environmental information challenges is its institutional focus. The EEA is first and foremost an information agency. Its structure and policy instrument mix allow it to focus on information concerns without battling internal organizational units which have traditional priorities that lie elsewhere. The relatively rapid progress it seems to be making to date testifies to this advantage. The EEA's major challenges relate to the complex socio-political environment in which it operates and the need to build the monetary resources and political leverage necessary to make full use of its institutional advantages. To tackle these challenges, it should take advantage of its institutional focus and build its credibility and independence without engaging in unnecessary and costly conflicts with other EU and member state institutions. This kind of approach

appears most likely to yield the additional financial and political support it needs to be effective over the long run. Eventually, these kinds of efforts may help the EU as a whole overcome the "implementation gap" (Bongaerts, 1994) that has hampered enforcement of its environmental regulations.

Second, both the EPA and the EEA should focus on benchmarking and information dissemination, although for different reasons. The EEA's emphasis on benchmarking and information dissemination is appropriate now because of the potentially divisive policy context in which it operates. While the long run success of EU environmental policy will probably require more regulatory and audience focused information efforts (similar to those used at EPA and, now, at DG XI), shared conceptions of environmental problems are necessary before more targeted program efforts will be fully successful. The EEA's benchmarking efforts can help create shared conceptions of environmental problems, and may facilitate progress that could not have occurred otherwise. It is also important for the EEA to focus on its dissemination efforts because its benchmarking work can be only as effective as its dissemination networks allow it to be. A strong and wide strategic focus is appropriate here because long term success will require reaching audiences not only in Brussels, but throughout Europe as well. While translation issues make the problem of widespread dissemination more difficult, it is no less important because of this fact.

Like the EEA, the EPA should focus more heavily on benchmarking and information dissemination. However, these emphases are important not to help EPA build a foundation for future regulation, but to help it move beyond the strong regulatory foundation it has already established. The EPA needs to focus more on benchmarking and information dissemination because these kinds of efforts will help it address the increasingly diffuse environmental

problems that now top its agenda. An increased use of benchmarking and information dissemination efforts would also help dissipate the conflictual atmosphere that has developed as a result of EPA's past reliance on regulatory policy instruments. Shared understandings engendered by benchmarking efforts would also increase the effectiveness of the agency's new cooperative management approaches, while more focused and comprehensive information dissemination efforts would re-enforce this cooperative ethic and build the capability of states and the private sector to address diffuse environmental problems. The EPA's regulatory programs have been successful and should be continued, but there is now a need to think beyond the institutional structures that were so important in helping create their success.

A final point relates to information quality. As information becomes a constitutive element of environmental regulation, its accuracy and reliability becomes more and more important. For information can only change behavior if it is thought to be accurate and reliable. In an age of information revolution, the future is likely to bring increased efforts to ensure the accuracy and reliability of information throughout society. The EPA and the EEA must not be left behind in this effort. In both agencies, this will require strong efforts to conceptualize a range of appropriate information quality standards, and persistent efforts to ensure that these information standards are consistently met. While both the EPA and EEA seem aware of these needs, maintaining a focus on them will require vigilance. This vigilance may not come easy in the day to day rush of what may appear to be more pressing priorities, but it is essential if the full potential of environmental information policy strategies are to be realized.

Explanatory Footnotes

1. The EPA does not, however, have primary authority over land management and conservation issues in the United States. At the national level, most of these authorities lie in the Department of Interior and the Department of Agriculture.
2. This is a broad definition of "information." For an interesting discussion that distinguishes between data, information, and evidence, see Majone's Evidence, Argument, and Persuasion in the Policy Process, 1989, Chapter 3. The definition of "information" used for purposes of this analysis encompasses data, information, and evidence, as defined by Majone.
3. It is worthwhile to note that the justificatory requirements for regulations at EPA have increased in the last twenty years. For example, the Paperwork Reduction Act (PRA), which was originally passed in 1980, requires that the EPA prepare an information collection "budget," and specific justifications for information collection efforts involving more than 9 parties outside of EPA. Similarly, requirements that the Agency prepare regulatory impact analyses for all major regulations have also increased the need for information development efforts to support regulations. For further discussion of these requirements, see Daniel Fiorino's Making Environmental Policy, 1995.
4. The EPA's Radon Action Program (RAP) provides a good example of a non-regulatory effort that has undertaken program support information efforts in the four areas provided as examples in Table 2. Its technical support document underlying The Citizen's Guide to Radon, its regular development of guidance for its state grant program, and its assistance to the radon industry through training and proficiency program development efforts were all examples of program support information development efforts that were not related to regulatory programs. In addition, the RAP's voluntary radon proficiency programs required "enforcement" types of information efforts because some state governments wrote EPA proficiency listing into their radon contractor certification requirements, and listed contractors who failed to meet EPA proficiency requirements while working in the field were subject to "de-listing" by the Agency.
5. Information of the kinds mentioned here might also be used to help guide program decisions. However, I have included these kinds of information efforts in the benchmarking category because the audiences for this information are potentially large, and the specific follow-up actions that would flow from its development are not entirely clear. As with any set of categories, the ones provided here are subject to "borderline" cases.
6. It should be noted that this selection of information to be communicated in motivational fashion can be a rather controversial activity within the agency because judgements regarding how to do this involve tradeoffs between likely persuasive impact and complete disclosure of all relevant scientific information. Not surprisingly, the conflicts occurring within agencies on these matters often pit communications or policy specialists favoring impactful information against scientists seeking full and complete disclosure of relevant information.
7. In recent years, there has been a growing literature in the area of "social marketing." See, for example, Social Marketing Quarterly, a professional journal published at the University of South Florida.
8. To understand the framework presented, it is worthwhile to note that the research underlying the recommendations in the permit writers guidance

would be a program support information development effort, while the preparation and communication of the information in the guidance document would be a motivational effort. Again, as with any framework, there are interfaces and borderlines among the categories presented.

9. While motivational efforts do tend to increase the focus on dissemination, it is important to note that program support and benchmarking efforts can also be coupled with very active dissemination efforts. And these kinds of program combinations may be quite advisable in a number of cases.
10. Several different versions of the EPA's mission that were promoted during various presidential administrations are included in Appendix 2 for illustrative purposes.
11. While the program offices tend to have responsibility for environmentally focused statutes, functional offices within EPA may have responsibility for administratively based statutes affecting agency operations such as the Administrative Procedures Act and the Paperwork Reduction Act.
12. For example, the Agency's Office of Policy, Planning, and Evaluation (OPPE) has become a focal point for resolution of concerns about the economic impacts and costs of environmental statutes. The Office of Research and Development (ORD) has focused on environmentally related research and the publication of numerous research reports. The EPA Regions have held implementation roles, either by directly implementing regulations and programs or by overseeing implementation carried out by state governments.
13. It is important to note, however, that the governing structure of the EEA does provide a vehicle for potential influence over member state involvement in the EIONET and other EEA activities. The EEA is governed by an 18 member Board, and 15 of these Board Members are representatives of the Member states. Consequently, EEA Board members may be in a position to elicit the cooperation of their governments with EEA activities.
14. In recent years, there have been a number of formal efforts to develop decision-making process that cross program office boundaries. Administrator Reilly's Cluster initiative and Administrator Browner's Sector based regulatory efforts are two significant examples.
15. It is worth noting that an argument can be made that these two benchmarking reports -- Unfinished Business and Reducing Risk -- were not only enabled by changes in organizational structure and policy instrument mixes, but also that the reports -- in turn -- contributed to accelerating these changes in organizational characteristics. There is probably some validity to this argument. If this is the case, it speaks to the value and potential of benchmarking efforts as catalysts for change within environmental agencies. It also suggests that there could be a reciprocally structured relationship between changes in organizational characteristics (organizational structure and policy instrument mixes) and professionally conducted benchmarking efforts.
16. However, I should note that the work on the Dobris Assessment began under the direction of the European Commission prior to the agency's actual establishment.
17. It is important to note, however, that the EU as a whole does have significant efforts underway in the area of motivational communications. Its environmental labeling program is a good example. However, to my knowledge, the EEA has not -- as yet -- taken a leadership role in these kinds of efforts.

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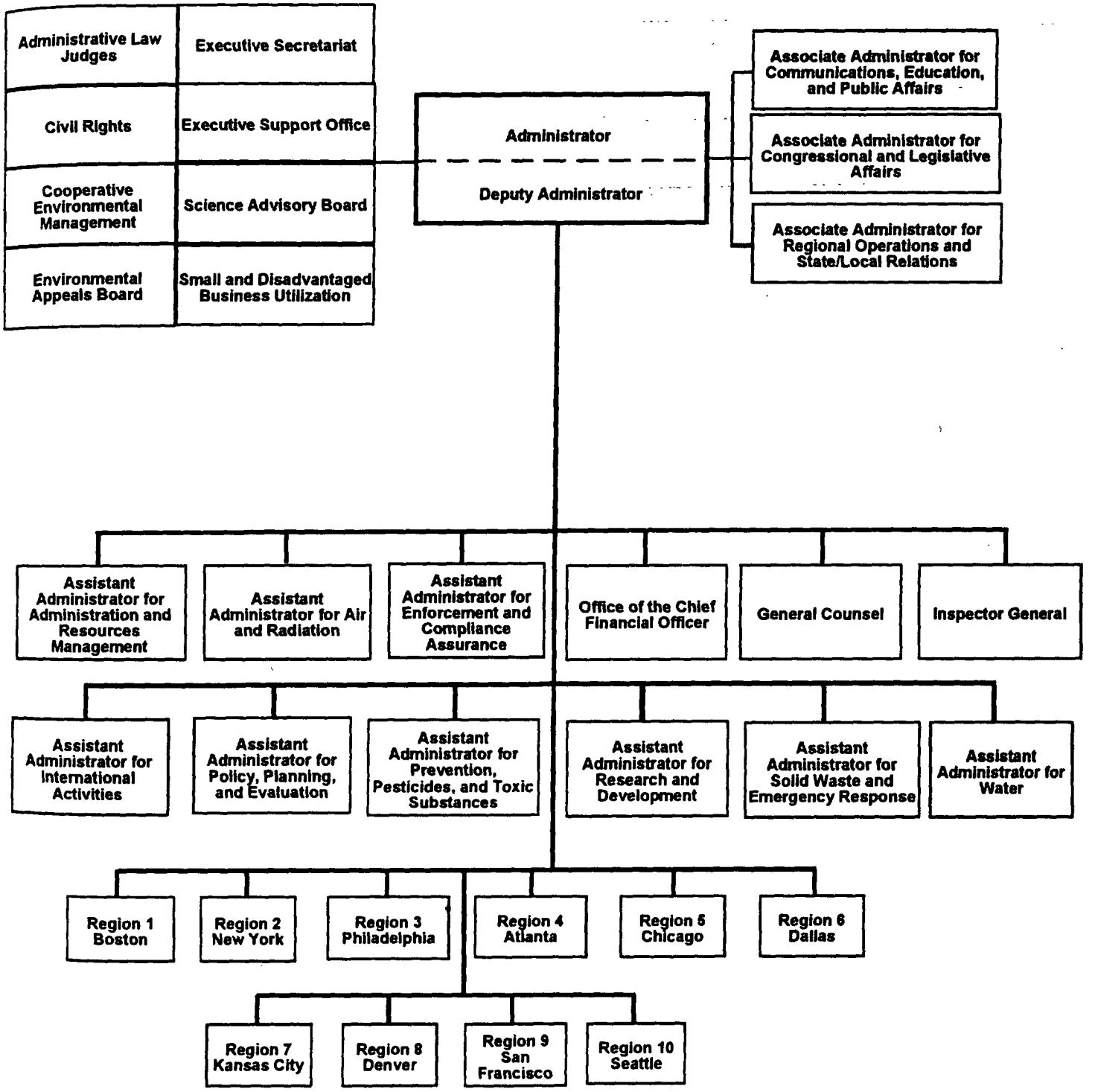
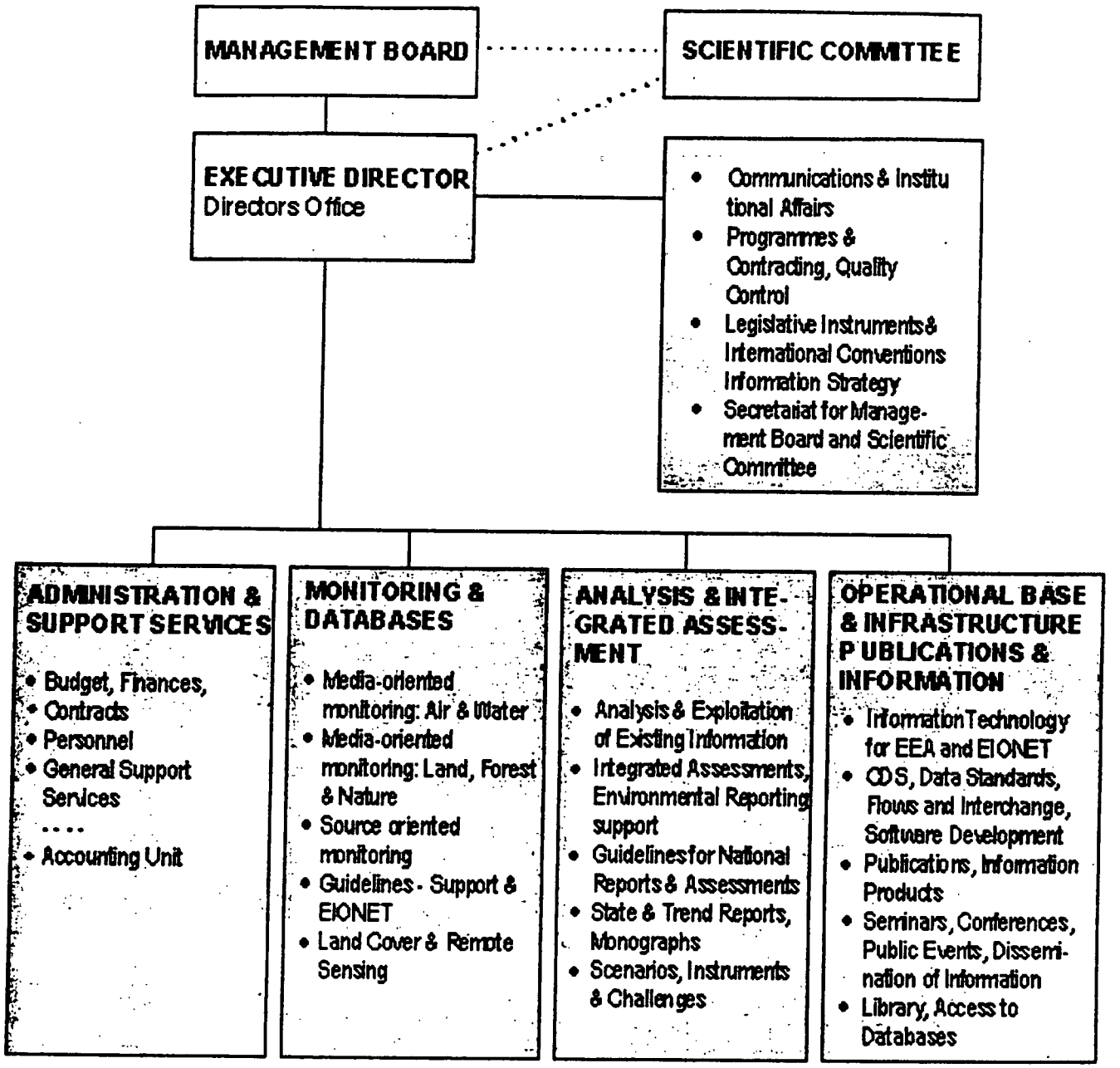
Environmental Protection Agency



Appendix 1

EEA

Organigramme



Appendix 2

AN AGENCY FOR THE ENVIRONMENT

Having dispatched these initiatives in spring, by early July the Administration could concentrate its full attention on the capstone of its program. Acting on Roy Ash's advice, the President decided to establish an autonomous regulatory body to oversee the enforcement of environmental policy. In a message to the House and Senate, he declared his intention to establish the U.S. Environmental Protection Agency (EPA) and left no doubts about its far-reaching powers. Nixon declared that its mission would center on:

- The establishment and enforcement of environmental protection standards consistent with national environmental goals.

- The conduct of research on the adverse effects of pollution and on methods and equipment for controlling it; the gathering of information on pollution; and the use of this information in strengthening environmental protection programs and recommending policy changes.

- Assisting others, through grants, technical assistance and other means, in arresting pollution of the environment.

- Assisting the Council on Environmental Quality in developing and recommending to the President new policies for the protection of the environment.

The President accompanied his statement with Reorganization Plan Number 3, dated July 9, 1970, in which he informed Congress of his wish to assemble the EPA from the sinews of three federal Departments, three Bureaus, three

STRATEGIC DIRECTION FOR THE ENVIRONMENTAL PROTECTION AGENCY
(1991)
"EPA... Preserving Our Future Today"

MISSION

The people who work at the Environmental Protection Agency are dedicated to improving the quality of the environment, both national and global. We work to protect human health and the productivity of natural resources on which all human activity depends. Highly skilled and culturally diverse, we are committed to using quality management processes that encourage teamwork and promote innovative and effective solutions to environmental problems. In particular, we are committed to ensuring that:

- Federal environmental laws are implemented and enforced effectively.
- U.S. policy, both foreign and domestic, fosters the integration of economic development and environmental protection so that economic growth can be sustained over the long term.
- Public and private decisions affecting energy, transportation, agriculture, industry, international trade, and natural resources fully integrate considerations of environmental quality.
- National efforts to reduce environmental risk are based on the best available scientific information communicated clearly to the public.
- Everyone in our society recognizes the value of preventing pollution before it is created.
- People have the information and incentives they need to make environmentally responsible choices in their daily lives.
- Schools and community institutions promote environmental stewardship as a national ethic.

GOALS AND OBJECTIVES

EPA's unique role in protecting the environment includes:

Providing leadership in the nation's environmental science, research, and assessment efforts.
We are committed to:

- Gathering and analyzing the date needed to evaluate environmental risks and trends, measure environmental results, and inform the choices of institutions and individuals throughout society;
- Promoting and supporting innovative technological solutions to environmental problems;
- Encouraging and conducting research that improves our understanding of health and ecological risks;
- Providing objective, reliable, and understandable information that helps build trust in EPA's judgement and actions; and
- Sharing research findings and innovative technologies with other nations.

Making sound regulatory and program decisions.
We are committed to:

- Implementing current environmental laws effectively, and helping to improve these laws as they are reauthorized in the future;

- Evaluating health and ecological risks, and targeting our environmental protection resources at the problems and geographic areas posing the greatest risks;

- Promoting public and private actions that prevent pollution at the source before it becomes a problem;

- Protecting the environment as a whole by developing programs that control the movement of pollutants across environmental media;

- Devising innovative, integrated solutions to environmental problems especially when they are concentrated in specific geographic areas or industries;'

- Improving the economic analyses that promote efficiency and cost-effectiveness in our decisions;

- Applying market mechanisms and economic incentives when they are appropriate and effective; and

- Working with other governmental agencies to ensure they consider the environmental implications of their actions.

Effectively carrying out our programs and policies.
We are committed to:

- Meeting Federal statutory obligations while retaining sufficient flexibility to address priority risks in different parts of the country;

- Maintaining a vigorous and credible enforcement program, with emphasis on multi-media and criminal violations;

- Promoting cross-media and interstate initiatives, such as multi-media permitting and enforcement;

- Enabling state and local governments, as partners, to implement and enforce environmental programs;

- Conveying clear, accurate, and timely information to the public, and incorporating information from the public in EPA activities; and

- Involving other government agencies, public interest groups, the regulated community, and the general public in achieving environmental goals.

Improving the global environment.
We are committed to:

- Maintaining and strengthening U.S. leadership to protect and improve the global commons;

- Working with other government agencies and nations, the private sector, and public interest groups to identify and solve transboundary pollution problems;

- Ensuring that environmental concerns are integrated into U.S. foreign policy, including trade, economic development, and other policies; and

- Providing technical assistance, new technology, and scientific expertise to other nations.

United States
Environmental Protection
Agency

Office of the Chief
Financial Officer
Washington DC 20460

EPA/190-R-97-002
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www.epa.gov

EPA STRATEGIC PLAN

The Mission of the Environmental Protection Agency is to protect human health and to safeguard the natural environment--air, water, and land--upon which life depends